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Faire face à la déflation en période de turbulence. Marchés agricoles et gestion des exploitations dans le sud de la Navarre (Espagne)

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Dealing with Deflation in Turbulent Times.Agricultural Markets and Rural Management in Southern Navarre (Spain), 1817-1833**

Abstract. The aim of this article is to identify common traits and local peculiarities in the widespread agricultural crises which were unleashed after the end of the Napoleonic Wars. The first part contains an outline of the deflation profiles and explanations of its causes. The second part shows the contrast between the deflation of prices and the evolution of production costs, as well as presenting evidence about the differential impact on family farms and those using wage labour, the latter being the most severely affected. Finally, we review and weigh the three main courses of action available to farmers for overcoming the situation: *i.e.*, organisational change, technical change, and institutional change. The first and third options were the most relevant for the region under study; nevertheless, modest signs of technical change were also found.

Résumé. Faire face à la déflation en période de turbulence. Marchés agricoles et gestion des exploitations dans le sud de la Navarre (Espagne)

Cet article se propose d'identifier les traits communs et les particularités locales à l'œuvre dans la crise agricole généralisée qui suivit les guerres napoléoniennes. La première partie s'attache à décrire les profils déflationnistes de cette crise et à en établir les causes. La seconde partie évoque le contraste entre la baisse des prix et l'évolution des coûts de production ; elle met en lumière l'impact différentiel de la crise, qui a davantage touché les exploitations recourant à une main-d'œuvre salariée que les exploitations familiales. Il s'agira enfin d'évaluer les trois principaux registres d'action auxquels peuvent recourir les agriculteurs pour faire face à la situation, à savoir un changement organisationnel, un changement technique et un changement institutionnel. Si la première et la troisième option s'avérèrent les plus adaptées à la situation de la région étudiée, on peut toutefois y observer quelques formes de changement technique.

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At a time like the present, when we are puzzled witnesses to a succession of steep rises in food and energy prices, immediately followed by falls so abrupt that they cause the almost forgotten ghost of deflation to re-emerge, the historian cannot help seeing analogies to other historical times. One of the most remarkable of these is the period following the Napoleonic Wars in Europe. As extensively recorded by the well-known historians who were associated with the *International Scientific Committee on Price History* Project in 1930 (Beveridge, Posthumus, Abel, Labrousse, Hamilton), agricultural prices collapsed after 1817, after previously reaching their highest point in centuries.

In the Spanish case, it was the economic historian Josep Fontana who, in his 1971 book and in a 1978 article, pointed out the importance of the 1817-1830 agrarian crisis, placing it in the wider European context, and concluded that it was a key stage in the transition to capitalism. In Fontana's view the price fall combined with problems in the Royal Treasury, which was no longer able to depend on shipments of precious metals from the Americas. This exacerbated the social contradictions within the Spanish agricultural sector, leaving the peasants with the choice of either rebelling against the liberal nation-state and its new tax policy or revolting against the recipients of the old feudal tributes and tithes: that is, to choose between reaction (Carlism) or revolution (liberalism)[1]. Since then we have learned a great deal more about issues such as structural changes in land ownership, social disputes, and evolution of some distributive variables such as wages and taxes during this period. But there are other changes that remain to be explored.

In this paper we offer a re-evaluation of the nature and consequences of the post-1817 depression, based on local sources and on private accounts from farmers' estates. First, the nature of the crisis is identified - if indeed we may talk of a unique crisis. We shall also attempt to detail the consequences of the crisis for farming and for the decisions which the various stakeholders.

1. Fontana, J., 1971.

1. Deflation and its profiles: One crisis or several?

The period of 1808-1839, along with the early years of Franco's regime (1936-1959), appears to have been the harshest in Spanish economic history. War was the deciding factor throughout these forty years: wars that resulted from foreign occupation (1808-1813), wars to attempt to keep colonies that had declared their independence (1814-1824), and wars intended to decide between the liberal and the counter-revolutionary visions of the nature of the state (1822-1823 and 1833-1839). The disruption caused by war to the public treasury and individual lives and fortunes was compounded by distortions in the functioning of markets. The period also saw the complete breakdown of the political system (in 1808) and three attempts at installing a liberal-inspired new institutional framework (1810-1813, 1820-1823, and finally, 1834-1837). In addition, with the loss of most of the overseas colonies and the end of shipments of American precious metals, it was necessary to re-direct foreign trade flows. Furthermore, violence on a daily basis was spreading, channelling the underlying social conflict through uprisings, banditry, and criminality[2].

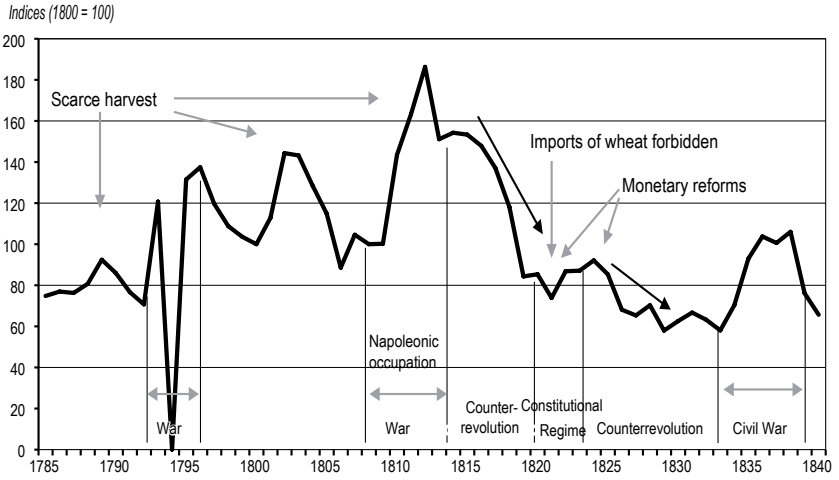
The prevailing tone of violence is also reflected in market behaviour and price movements. Figure 1 sums up the evolution of agricultural prices in Southern Navarre in 1785-1840. It is a Laspeyres index with fixed weighting of eight agricultural goods which accounted for more than 90 per cent of the region's produce[3]. The index profile shows the well-known upward trend of agricultural prices through the eighteenth century, its paroxysm coinciding with the political cycle of the French Revolution. The shift in this trend in the following years lasted until the mid-nineteenth century. Figure 1 includes the main factors accounting for upward movements in the curve: wars against France in 1793-1796, 1808-1814, and 1823, civil wars in 1822-1823 and 1833-1839, poor cereal crops in 1788-1789, 1801-1802, 1802-1803, 1811-1812, 1815-1816, and 1831-1832, monetary reform in 1821 (annulled by counter-reformation in 1824), and finally, the ban on foreign grain imports which the constitutional government passed

2. For an overview of this period for Spanish rural areas, see M. T. Pérez Picazo, 1998. Social conflicts, banditry and delinquency are well analysed in J. Torras, 1976. On Navarre, see J. De la Torre, 1990; 1992; and Del Río, R., 1987.

3. The index is comprised as follows: wheat (37%), barley (13%), beans (5%), wine (17%), olive oil (15%), beef (2%), lamb (4%), and ordinary wool (7%). Prices are taken from private accounts and reflect producer wholesale prices per accounting year. Further details are in J. M. Lana-Berasain, 2011.

on 5 August 1820[4]. In addition to this upward cycle, the figure highlights the phenomenon that matters here: the steep fall in agricultural prices in 1815-1830, the well-known European agrarian crisis analysed in detail by Wilhelm Abel[5].

Figure 1. *Index of agricultural prices in southern Navarre, 1785-1840*



Source. Lana-Berasain, J.-M., 2011.

Is it possible to talk of a single crisis, or would it be more appropriate to consider it as two consecutive crises, one in 1817-1819, and the other in 1825-1829? The latter seems to have been the case, as suggested by the

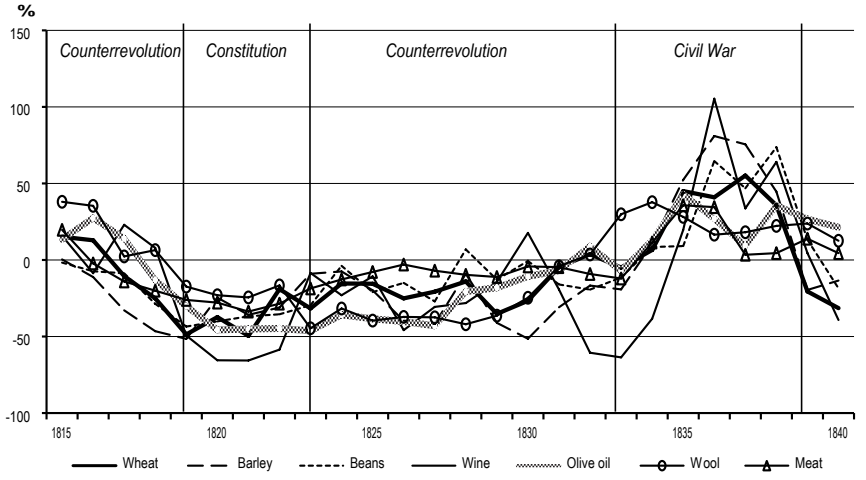
4. The ban was respected by Ferdinand VII after his restoration as absolute monarch in 1823. Under the law, import of wheat would only be allowed in cases of extreme scarcity, when wheat prices reached 144 *reales de vellón* (*rvn*, from now on) per hectolitre (hl) (Montañés, E., 2009, p. 35). This coincided with similar regulations in England (1815, reformed in 1822 and 1828), which prohibited all wheat imports provided that the national price had not reached 80 shillings per quarter. France followed the same route in 1819 and so did the Netherlands in 1824 (Abel, W., 1986, p. 309, 314). In any case legal imports of wheat at the port of Barcelona continued between 1823 and 1827 (Fradera, J. M., 1984, p. 158-162), while smuggling of wheat reached a very significant but unknown magnitude (Calosci, L., 2006, p. 35-37).

5. Abel, in fact, defines the early nineteenth century agricultural crisis as a three-phase phenomenon: 1801-1805, 1806-1817, and 1818-1830 (Abel, W., 1986, p. 304-318).

cyclical movement of the curve, with its differentiated slopes; moreover, eminent scholars believe the second interpretation to be the right one[6].

But, how would it have appeared to those living at the time of the events? Labrousse suggests that we view it from their perspective, limiting our picture of price movement to what has already occurred and not to what will happen in the future. Figure 2 is intended to provide that viewpoint, presenting each year's prices as a percentage increase or decrease over the average of the previous ten years. For a more complete picture, Figure 2 provides this information for each of the products comprising the index of agricultural prices. The result is conclusive. From the viewpoint of those who sold agricultural products in the market, each successive year resulted in prices lower than the previous ten years. This was the case almost without exception from 1818 to 1833; fifteen years in a row of a negative relationship to the market. But did this also occur elsewhere on the continent?

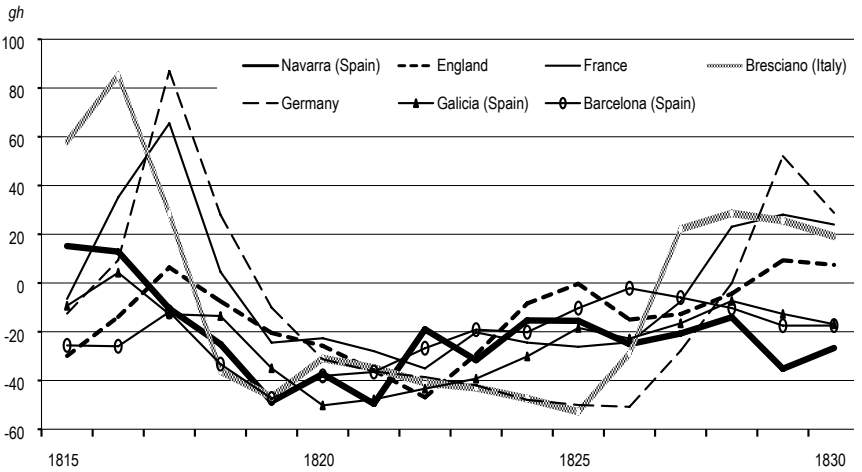
Figure 2. *Perception of a contemporary person.*
Variation percentage for each year in respect of the ten previous years' average



Source. Lana-Berasain, J.-M., 2011.

6. The crisis, starting in 1825 and becoming worse in 1827-1828, was the prelude to the political revolution of 1830, according to E. Labrousse, 1980, p. 466-467, the crisis resulted from scarcity, not deflation, and was due to bad potato and cereal crops. The crisis also occurred in rural England, where it fuelled the Captain Swing uprising (Hobsbawm, E. & Rudé, G., 1985, p. 31-38). See also J. Marczewski, 1988.

Figure 3. *Wheat price evolution in Europe (1815-1830): a contemporary view: Percentage variations in annual prices with respect to the previous ten years*



Source. My construct from ABEL, 1986, p. 432-433, TEDESCHI, 2006, p. 465, 480, KONDO, 1990, p. 253-256 and NOGUÉS, 2005, p. 395-396.

(Germany´s prices are averaged from those of Hamburg, Rostock, Berlin, and Munich; those of Galicia are an average of Coruña, Lugo, and Pontevedra's prices).

Even though it is not possible to compare the evolution of weighted indexes of agricultural prices, we can examine the history of wheat prices, undoubtedly the most important agricultural product. Figure 3 allows us to see similarities and differences in the way various European regions perceived deflation. Everywhere the fall of prices was constant for around a decade. The difference lies in when it began and when it ended: in England and Spain this was earlier than in Lombardy, France, and Germany. Moreover, Navarre was remarkably similar to Galicia and Barcelona, despite the fact that it had a customs and monetary system of its own until 1835. Therefore, it was not the peculiar customs policy of Navarre – which almost completely banned cereal exports from the Kingdom – or the narrowness of the domestic market that played a relevant role in the intensity and duration of deflation.[7] What distinguishes Navarre – and Galicia and Barcelona as well – from the rest of Europe was the extraordinary duration of the price

7. Act 52, passed by the 1724-1726 Parliament (*Cortes*), which updated older regulations of 1567, 1662, and 1678, banned the export of grains unless wheat reached a certain specific price in the main cities (30 *rvn* per hectoliter, and never more than 40 *rvn*/hl) (FLORISTÁN-IMÍZCOZ, A., 1982, p. 348-349). The 1817-1818 Parliament, after a crowded debate, somehow succeeded in relaxing that ban, increasing the reference price to allow exports at

fall, which remained negative up to the 1830s, when other countries were already experiencing higher wheat prices. Thus, in Spain the agricultural crisis was more intense than in other parts of Europe, since it started earlier and finished much later. To those living at the time, therefore, the depression may have been seen as a single, endless phenomenon. Comparison with other regions, however, leads us to consider that it may have been due to a series of factors common to the entire continent, combined with some others specific to Spain and some that were very local.

From Figures 2 and 3 we can deduce information about factors which caused the fall in prices. Two explanations do not seem to work when viewed from a global perspective. The first holds that the price fall was not exceptional, but only a return to the levels of the late eighteenth century, before the French revolutionary cycle disrupted European markets. There was nothing forcing prices to return to a level abandoned forty years before; all the more if we take into account the widespread circulation of paper money and inflationary rise in the means of payment that happened in the meantime. But it is possible that in the Spanish case (as well as in the British) much of the early, dramatic price collapse may be an adjustment after the inflationary processes generated by the Peninsular War and the Continental System[8].

The second explanation, the monetary interpretation, according to which the reduction in monetary supply accounts for the falling prices, is also unsatisfactory. This theory accounts for the fall either through reduced monetary production and the introduction of American silver, or from tighter control on paper money issue by European governments[9]. The historical counter-arguments have been that the low supply of gold and silver following the American wars of independence may have been more than counterbalanced by the change in the commercial balance with Asia - China in particular - as a result of the opium trade[10]. If the explanation is indeed the amount of circulating money, however, the effect on each and all of the goods should have been the same. But that is not the case. Although the

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106.65 *rvn*/hl (*Cuadernos de Leyes y Agravios*, Pamplona, Institución Príncipe de Viana, 1964, vol. 2, p. 342-351).

8. Van Bath, B. H. S., 1978, p. 337-339; Nogués, P., 2005, p. 382.

9. Vilar, P., 1982, p. 465-466; Kindleberger, C. P., 1988, p. 86-88; Crouzet, F., 1999, p. 46-48.

10. Fontana, J., 1978; although the annual average production of gold and silver fell between 1801-1810 and 1811-1820 around 35-40 per cent (Ortí Brull, V., 1893, p. 174-175), other forms of money supply (such as deposits, orders, and bills of exchange) could make up for it (Cameron, R., 1974, p. 59-68).

monetary explanation is not sufficiently credible in general terms, it does shed some light on the peculiarities of the Spanish case, and particularly on the extraordinary duration of the depression and on its relative improvement in the early 1820s. The monetary reform adopted by the constitutional regime on 21 June 1821 led to expectations that the monetary supply would be increased through the devaluation implicit in increased rates of acquisition and in reduced retentions to cover minting costs (*braceaje*) and taxes (*señoreaje*). The reverse effect occurred in the 20 August 1824 monetary counter-reformation which, in seeking to increase fiscal income, raised retention rates and sharply reduced prices for metal purchases, setting them below the equilibrium price. This policy, which remained in force until the 15 April 1848 monetary reform, reduced minting activity. Furthermore, there was much hoarding and exporting of silver coins caused by mistaken decisions on exchange rates with the French franc and a bi-metallic relationship that undervalued silver with respect to gold. The overall result was an acute monetary shortage in Spain, for which the Kingdom of Navarre's monetary autonomy was no compensation[11].

Setting aside these explanations, except as contributory factors, we should focus on the supply and demand side. From the supply viewpoint, the falling prices may have been the consequence of overproduction brought about by using extensive methods to increase productive capacity, or by an increase in productivity that led to a corresponding reduction in production cost, through specialisation (Smith) or technological change (Schumpeter). Extensive cultivation methods are not rare during widespread warfare, as was the case in Europe in 1792-1815, where the problems of nations at war may have boosted the productive capacity of regions distant from the front with low technological potential. The clearest example of this was the southern Russian steppes, which began to trade grain through the port of Odessa[12]. The technological explanation is also feasible on a European level if we consider that several regions (especially the English countryside) had been experiencing intense transformations since the mid-eighteenth century owing to the spread of new growing techniques that provided improved yields[13].

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11. The characterization of 1821 and 1824 monetary reforms follows J. Sardá, 1948, p. 43-76 and P. Pascual, 2004, p. 62-67. Minting in the Kingdom of Navarre was restricted to copper coins from the mid-seventeenth century. The scarcity of this metal forced people to accept two consecutive devaluations: from 122 monetary pieces produced (*maravedís*) per peso unit (pound) to 181 in 1818, and 191 in 1829 (Marín de la Salud, J., 1975, p. 351-454).

12. Van Zanden, J. L. & Van Riel, A., 2000, p. 125.

13. Thompson, F. M. L., 1968; Chorley, G. P. H., 1981.

Furthermore, this supply-side explanation finds support in the differing behaviour of the prices of various goods. Thus, while price falls were soon apparent in grains (wheat, barley, beans), and in beef, such falls in other products (especially those from the Mediterranean, such as wine, olive oil, and wool) took longer. Should we interpret this as an effect of better goods transport on the continent, and increased competition for typical northern Europe agricultural goods? We should not forget that price formation in a poorly accessible interior reflected the likelihood of directing surplus to large consumer markets on the coast such as Barcelona, which were open to cheaper imports[14]. Yet difficulties soon reached those sectors, too. Wine was especially volatile, with severe price collapses in 1819-1822 and 1832-1833. In fact, throughout the 1820s, it was these Mediterranean tree and shrub products – whose supply was inflexible because of the fixed capital costs of plantation – that suffered from a serious fall. Meanwhile, cereals were favoured by an 1820 customs ban and experienced a slight improvement; however, their price fell again in 1826 and 1829-1830.

Table 1. *Index of baptisms in Northern and Southern Navarre (1797-1801=100)*

	North (cattle and forest)		*South (agriculture)*		*Navarre*	
	Index	*%*	*Index*	*%*	*Index*	*%*
1782-1786	87		88		87	
1787-1791	87	0.4	87	-1.1	87	-0.4
1792-1796	87	-0.6	96	10.5	92	5.5
1797-1801	100	15.5	100	3.9	100	8.8
1802-1806	100	-0.5	99	-0.8	99	-0.6
1807-1811	109	9.8	101	1.9	105	5.4
1812-1816	90	-17.5	97	-4.5	94	-10.5
1817-1821	99	10.2	106	10.2	103	10.2
1822-1826	112	13.0	109	2.5	111	7.0
1827-1831	119	5.5	111	1.5	114	3.3
1832-1836	115	-2.6	104	-5.8	109	-4.3
1837-1841	112	-2.6	99	-4.9	105	-3.8

Source. My construct from A. García-Sanz-Marcotegui, 1992.

14. Pascual, P., 1990, p. 8.

If we search for an explanation on the demand level, the sustained fall in agricultural prices could have been a consequence of demographic stagnation, a fall in consumer purchasing capacity, or an increase in auto-consumption. The first of these hypotheses is not even credible at a local level, let alone a continental one. The records of baptisms performed in Navarre reveal several points of marked demographic retreat, both in the north, devoted to cattle ranching and forestry, and in the agricultural south; these coincided with consecutive periods of war and famine early in the century. Nevertheless, the overall balance is positive and especially prolonged from 1817 to 1831. The second hypothesis, a fall in consumer purchasing capacity seems feasible if we follow contemporary testimony. Thus, in April 1818, the Parliament of Navarre was forced to take measures against beggars, because « *la multitud de pobres que vienen a algunos pueblos los inficionan a éstos, concluyéndose no pocas veces en darse muchos de ellos a ladrones públicos, y siguiéndose de todo esto el entibiarse la caridad de los Cristianos y quitarse la limosna a los naturales* » (« the high number of poor coming to some villages infected them, and it is not rare for many of them to end up as public thieves, all of this leading to a cooling down of Christian charity and the witholding of alms from local people »)[15]. This picture of misery was echoed by foreign observers like P. Deby, who referred in 1825 to « *des villages où une population flétrie par l'indigence semble se débattre contre les causes qui retardent son bien-être* » (« villages where the poverty-stricken population, seems to be struggling against the causes which hamper its well-being »), although A. Moreau de Jonnès stated ten years later that « *la multitud de mendigos va disminuyendo, cesando las limosnas que encontraban en las puertas de los monasterios* » (« the crowd of mendicants is diminishing, as the alms at the monasteries' doors are ceasing »)[16]. Rural misery does not fit at all with the evolution evident in real wages, since daily wages -as we are about to see – suffered less than prices. We should bear in mind, however, that the rising purchasing power may be compatible with a reduction in real income, if job opportunities also diminish, leading to a reduction in days worked per year. Finally, the spread of a subsistence economy may have been a way to minimize the adverse effect, in view of the continuing fall in market prices and job opportunities.

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15. *Cuadernos de Leyes y Agravios*, Pamplona, Institución Príncipe de Viana, 1964, vol. 2, p. 320. Act 74 set harsh rules to reduce the number of vagabonds and beggars, submitting such activity to a regime of temporary licenses granted locally by the parish priest and the mayor. In January 1830, the city of Tudela created a Charity Board to take charge of collecting provisions and distributing them to the poor, dealing with up to 3,082 needy, and allocating 385 hectoliters of wheat, 73 of legumes, 149 pieces of bread, and 3,334 *reales* (Fuentes Pascual, F., 1958, p. 167-168).

16. Deby, P. N.H., 1825, p. 128; Moreau de Jonnes, A., 1835, p. 93.

But, if such was the case, it would have been more a consequence than a cause of deflation. Besides, the opposite position can also be defended. Small producers may have strengthened their ties to the market by increasing the amount of marketed crops, which was promoted by the popularity of the potato, or by pushing forward with specialisation in market crops such as the vineyards or olive orchards. The growing need of the state to collect cash taxes, as Fontana pointed out, also supports the latter option. The fact that the ban on cereal imports fostered the integration of the domestic market, despite Spain's transport limitations, argues against the notion of a withdrawal into subsistence[17]. Moreover, a general phenomenon such as a European-wide deflation must be explained through causes of an equally widespread validity.

One final argument deserves consideration. While the prices of goods were falling, the relative cost of transport was increasing. In Navarre agricultural prices were cut almost in half but daily rental for a two-mule cart was only reduced from 32 *reales de vellón* to 24 and 20 *rvn*, and the daily cost of mule transport went down only from 12 to 9 and 8 *rvn*, and the cost of using of donkeys went from 6 *reales* to 5 and 4 *rvn*. In all three cases, the decrease was only 25 per cent until 1820, and even a third during that decade – much less than the fall in prices of agricultural products in the corresponding period. This phenomenon was probably not an exception in the European context, and perhaps had a backlash effect on the supply of goods. Ultimately, it may have contributed to the efforts to reduce transport costs through investment in infrastructure and technological change.

All in all, it seems that, when trying to explain the causes of the deep deflation which started in 1817, we should favour an eclectic interpretation that stresses, as did Abel[18], supply factors, but which does not completely exclude other arguments. The increase in the productive capacity of European agriculture in the last decades of the eighteenth century, in some cases owing to technical improvements and in others to the removal of institutional barriers, was fully apparent when the end of Napoleonic Wars allowed commercial flow to resume on a continent-wide level. The fall in prices, with different sequences for each of the goods, may have been worsened by the relative rise in transport costs, especially for those inland regions that had to entrust their merchandise to systems as expensive and ineffective as bridle paths, or at best, cart-tracks. The reduction in demand in the large coastal centres of consumption, as they turned to cheaper sea-

17. Fontana, J., 1978; Madrazo, S., 1984; Barquín, R., 1996.

18. Abel, W., 1986, p. 328-331.

borne supplies, reduced the demand for some products that could not be re-channelled. Stocks were piling up, as manager Julián de Larumbe warned in May of 1818 from Cintruénigo: « *por falta de compradores* » (« due to a lack of buyers ») and because « *hay muchos ganosos de vender a dicho precio y aún a menos* » (« there are many willing to sell at that price and even for less »)[19]. The decrease in circulating money may have worsened the situation; it is a convincing argument to explain the extraordinary duration and intensity of Spanish deflation with respect to Europe.

2. Victims and answers: organisational, technical or political change?

Deflation did not affect all social groups equally, nor all agricultural production stakeholders. Naturally, it favoured consumers who saw their purchasing power increased. This was certainly an advantage, provided they were able to pay, which was not always the case[20]. First, we must consider the currency shortage itself, especially severe in the case of copper coins used for small transactions[21]. Currency was scarcer in rural areas, where barter often made up for the absence of cash; therefore, the advantages of deflation were probably limited to cities, where a greater number of people relied on market relationships[22]. There are contemporary testimonies condemning the high level of consumption by artisans, traders, and people in the liberal professions compared to the low consumption of the rural masses[23]. Nevertheless, artisans and their employees did not enjoy such a

19. Archivo Histórico Nacional (AHN), Sección Nobleza, Bornos, c.172, d.1.

20. Anes, G., 1970, p. 437.

21. The worst shortage of small change must have coincided with the turn of the century. None of the 30,000 *ducados* commissioned for minting by the Parliament (*Cortes*) of Navarre in 1796 were made, and of an equal amount ordered by this institution in 1818, only half were actually minted. Of the 20,000 *duros* commissioned by the Parliament in 1829, 48 per cent was still to be minted in 1838. (Marín de la Salud, J., 1975, p. 351-438). In all of Spain, the eight million *reales* minted in silver and gold in 1824-1834 were, according to Sardá, clearly insufficient (Sardá, J., 1948, p. 70). The shortage of national cash was compensated, as the authors quoted point out, by the abundant circulation of silver and copper French currency.

22. Fontana, J., 1971, p. 334-336.

23. A clergyman who introduced himself as the *Procurador de los labradores del País del Grano* (Attorney General of Grain Farmers of the Country) outlined in 1817 a picturesque contrast between the farmers consumption and that of traders and artisans, concluding: « *Mírense los adornos de sus casas y el de las nuestras, mírese cómo visten, comen y beben ellos y sus familias, y cómo nosotros, y se hallará una diferencia exorbitante* » (« Look at the ornaments in their houses, and at those in ours; look at how they and their families dress, eat and drink, and how we do; you shall find an exorbitant difference ») (Archivo General de Navarra, AGN, Reino, Agricultura Artes &, lg.3, c.14). Joaquín Undiano, parish priest

significant improvement either; free-import customs policy for cloth and profitable smuggling between France and Castile flooded the country with cheap manufactured goods[24]. The outlook for other urban sectors dedicated to trade, law, and money-lending was surely more promising. In addition to the business opportunities offered to traders by smuggling, all of them, including clergymen, had strengthened their positions as creditors because of the income generated from loaned capital, the purchasing capacity of which increased owing to deflation.

Though consumers and creditors may have been favoured by deflation, producers and debtors were not so fortunate – and often they were the same people. Peasants and urban traders requested most of the mortgage loans (60%), though in small amounts (only 23% of borrowed capital); the nobility held most of the money (29%), with landowners (20%) and then city magistrates[25]. It must have been particularly hard to pay fixed amounts of money while prices decreased and the state increased taxes. A good example of that was the Giménez de Cascante family, who were nobles entitled to a seat in the Parliament of Navarre. Their four entailed estates (*mayorazgos*) covered 83 hectares, and they also had 13 hectares as free estates in 1830[26]. On the entailed estates there were loans representing 321,559 r*eales de vellón* (*rvn*), which had to be paid off with annual returns for 8,114 *rvn*. While this amount remained unchanged between 1815 and 1830, prices of wheat and olive oil, the estate's main sources of income, were reduced by 61 per cent. In 1830, it was not unusual for these entailed estates to be owed 42,819 *rvn*, the equivalent of more than five annual payments[27]. If this was

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of Lizarraga, stated in a *memorandum* to the Parliament that « e*ntre todas las clases de la sociedad ninguna se mantiene con tanta escasez y miseria... Los labradores son los que peor comen, los que peor beben, los que peor visten, sin embargo de ser los que más trabajan* » (« among all of the classes of society, none subsists with such scarcity and misery... Peasants are the worst fed and dressed; however, they are the ones who work the most ») (AGN, Reino, Estadística, lg.49, c.29).

24. It does not seem that the efforts of the Parliament of Navarre to foster local industry making it easier for foreign manufacturers to settle – were of much use. About the smuggling issue, see R. Del Río, 1985, p. 169-199.

25. Lana-Berasain, J.-M. & De la Torre, J., 2011.

26. AGN, Sección Archivos Particulares, Baronía de la Torre, box 1, Inventario post-mortem de José María Giménez de Cascante.

27. To that, the accrued debt of the free estate, 2,914 *rvn*, has to be added. That sum was set to respond for another seven loans of 64,637 *rvn*. In 1827, an arranged marriage of José María Giménez de Cascante to the daughter of the Baron of Beniparrell allowed him to use the 10,647 *rvn* dowry in « *pagamentos censales y otras urgentes obligaciones* » (« mortgage payments and other urgent obligations ») (AGN, Sección Archivos Particulares, Baronía de la Torre, box 1). Besides, in 1824 and 1828 and after permission by the royal courts, they were forced to sell several farms of the entailed estate for a total of 31,024 *rvn* (*ibid*.). This family

the case for a very powerful family, it is easy to imagine the consequences of indebtedness for more modest estates.

For farmers, in fact, deflation had terrible consequences. Figure 4 allows us to assess the evolution of agricultural prices and the costs of the main factors for this. The series is shown as a series of index numbers with a base (= 100) in a much earlier period: 1783-1787. In this way, the distortions caused by the acute inflation of the Peninsular War period are avoided. What is more, it allows us to incorporate fluctuations in the series during the long wave that began in that decade.

Table 2. *Simulation of an account of income and expenses of cultivation per land hectare for exploitations with wage labour and family labour in biennial cultivation (*« año y vez »*)*

	Unit	*1815*	*1820*	*1825*	*1830*
Technical rates					
Sowing frame	Hl/ha	2.35	2.35	2.35	2.35
Yield per seed	1:	5	5	5	5
Wheat production	Hl/ha	11.75	11.75	11.75	11.75
	Deductions				
Tithe	Hl/ha	1.47	1.47	1.47	1.47
Reserved seed	Hl/ha	2.35	2.35	2.35	2.35
Land rent	Hl/ha	1.86	1.86	1.86	1.86
Available for sale	Hl/ha	6.07	6.07	6.07	6.07
	Cultivation rates				
Fertilizers	Qm/ha	9.4	9.4	9.4	9.4
Fertilizer application	Peons/ha	0.6	0.6	0.6	0.6
Plough fallows	Yoke/ha	6.7	6.7	6.7	6.7
Dig fallows	Peons/ha	25	25	25	25
Sowing	Peons/ha	0.6	0.6	0.6	0.6
Seed covering	Yoke/ha	2.7	2.7	2.7	2.7
Hoeing	Women/ha	4.5	4.5	4.5	4.5
Reaping	Peons/ha	11.1	11.1	11.1	11.1

was one of the 113 houses in the Kingdom that had to pay the compulsory loan imposed by the French general Reille. The requested 900 *duros* (equivalent to 18,000 *rvn*) had forced them to sell a house and two orchards, which had to be rescued by « *empeñarse por una parte y malvender sus frutos por otra* » (« pawning, on the one hand, and selling the fruits at a loss, on the other ») (*ibídem*).

Threshing and throwing	Peons/ha	3.5	3.5	3.5	3.5
Threshing and throwing	Yoke/ha	1.2	1.2	1.2	1.2
Cart-carrying	Carts/ha	0.4	0.4	0.4	0.4
Horse carrying	Horses/ha	1.6	1.6	1.6	1.6
	Prices				
Male day-wage	Rvn/day	6.7	5.3	4.7	4.4
Female day-wage	Rvn/day	2.5	2.2	2.3	1.9
Yoke day-pay	Rvn/day	24.7	18.8	18.1	16.0
Cart day-pay	Rvn/day	32	26	24	22.5
Horse day-pay	Rvn/day	12	8.3	8	8
Manure	Rvn/Qm	2.7	2.5	2.0	1.8
Wheat price (Aug-Sept)	Rvn/hl	90.3	62.0	56.5	45.0
Wheat price (Apr-May)	Rvn/hl	100.5	71.6	60.5	50.6
	Crop value				
In August-September prices:	Rvn/ha	548.1	376.3	343.1	273.1
In April-May prices	Rvn/ha	610.0	435.0	367.3	307.0
Model with wage labour					
a. Wheeling and manure cost	Rvn/ha	299.50	233.57	219.95	195.30
b. Cost of labour	Rvn/ha	116.62	94.28	84.45	77.52
Outlay (a+b)	Rvn/ha	416.11	327.85	304.41	272.81
Available balance*	Rvn/ha	193.89	107.14	62.84	34.22
Index		100	55.3	32.4	17.7
	Model with family labour				
a. Wheeling and manure cost	Rvn/ha	140.72	110.24	102.08	92.04
b. Cost of labour	Rvn/ha	283.34	227.67	201.82	186.38
Outlay (a)	Rvn/ha	140.72	110.24	102.08	92.04
Available balance*	Rvn/ha	407.35	266.02	241.01	181.04
Index		100	65.3	59.2	44.4
Equivalent wheat	Hl/ha	4.51	4.29	4.27	4.03
Index		100	95.1	94.7	89.4

* The calculations for the wage model and the family labour model differ in land-preparatory tasks before sowing and carrying of the ripe grains. The wage model implies execution of three yoke and plough tasks and carrying in a two -wheel and two-animal-cart. The family labour implies a manual preparatory task and carrying by horseback. The produce in the wage model is sold at April-May prices; the family labour model at August-September prices.

Sources. Jaen, C., 1904, p. 143-182 and Junta Consultiva Agronómica (1891, II, p. 461-504) for labour rates; Barquín, 2001, for average wheat prices in Tudela in August-September and April-May; average prices of factors are taken from the above private accounts.

By 1815 the inflationary process had affected, in this order: equipment, agricultural prices, and daily wages. The rent on the land, paid in a fixed amount of grain, was 12 per cent higher than the 1785 rent, while the interest on long-term mortgage money had risen by 30 per cent. By 1821 agricultural prices had returned to those of the 1780s. Farm equipment drawn by animals and labour costs had adjusted as well; this adjustment, though, did not make up for the fall in agricultural prices. For those offering their services or their animals for rent, this was undoubtedly good news; however, for those forced to hire them, it represented a steep rise in costs. On the other hand, the rental price for land and money loans tended to increase until 1826, and then become stable. Agricultural prices, however, collapsed irremediably to a level lower than that of 1785[28]. Table 2 shows some of the consequences of this evolution for price and cost structures in agricultural operations.

In this simulation credible technical rates and average prices in five-year periods around 1815, 1820, 1825, and 1830 are used to estimate operation margins for those large production units employing wage labour (referred to hereafter as « commercial farms ») and the small farms using family labour alone (« family farms » which could also produce for the market)[29]. For the first, more capital and labour-intensive, needs have been assumed as 31.3 days' wages per hectare, 11 of which would be for draught animals and carts. The second type of farms, more labour-intensive, would require 50.8 days' pay per hectare, and only 5.5 for animal use. If we assume wheat was cultivated at 11.75 hls/ha, and deduct tithes, seed, and land-rent amounts, the amount available to be traded would be

28. Proof of the evolution of factor cost in other regions can be found in M. T. Pérez Picazo, 2005, and E. L. Garrabou & L. Tello, 2002.

29. In order to calculate production per hectare, the initial sowing frame was set as 2.36 hl of wheat per ha, a figure proven by several sources (among them, AGN, Reino, Estadística, lg. 49, c.29), and a seed yield of 1:5. That is how a yield of 11.75 hl of wheat per hectare is suggested. From that quantity, a 12.5% deduction is deducted as tithe and first-fruit (*diezmo y primicia*) payment obligations, seed reserve for the next sowing and a quantity of 1.86 hl of wheat as land rent; all of these data come from private accounts. Technical rates of costs for farming for the region are taken from data recorded by engineers of the *Servicio Nacional Agronómico* (Agricultural National Service) by the late nineteenth century, assuming that, except when dealing with modern farming equipment, criteria and intensity for agriculture had not changed substantially. A different combination of farming practices has been assumed for the two types of holdings. That using wage labour, presumably with higher amounts of land and capital, would use draught animals for ploughing, while the small family farm would use manual labour with hoes and other implements, since the opportunity cost would be lower for them. On similar grounds, it has been assumed that commercial farms would use higher capacity equipment (*carts*), while family farms would use cheaper horseback transport. For fertilizer, we assumed the use of 4,700 kg of manure per hectare every five years.

6.07 hls/ha. The simulation presents two levels of wheat prices: one for the months immediately prior to harvest (April-May), when large productive units with wage labour could wait to trade their produce, and another for the months immediately following (August-September), when we assume small family exploitations were forced to sell. In both cases, at the average prices in force for each period, the produce per hectare would have been cut in half. Meanwhile, assuming that working methods had not changed, costs would have been cut only by a third. For the large production units purchasing all of their inputs from the market, this would have meant a fall in net income from 194 *reales* per hectare around 1815 to 107 *reales* in 1820, 63 *reales* around 1825, and 34 *reales* in 1830. The market evolution, therefore, seriously affected producers more closely linked to it, reducing their income to 18 per cent of what they could have enjoyed around 1815.

Meanwhile, the holding that used a family labour force, or resorted to bartering labour with similar farms during peaks of seasonal activity, was better able to endure the crisis. By replacing the three plough tasks by deep-digging with manual implements and by doing without wage-earners for the other tasks, farming costs directly dependent on market supply were cut to a third of the total. In this way, its cash on hand, assuming all the produce was traded, would have suffered only a minor decrease from 407 *reales* per hectare around 1815 to 266 *reales* in 1820, 241 *reales* around 1825, and 181 *reales* in 1830. If we assume that such a balance was not held in cash but kept as wheat to feed the family, the figures would have shifted from four and a half hectolitres per hectare in 1815 to four hectolitres in 1830, or only 10 per cent less. If we accept that the amount of wheat required to feed a person for a year was 800 grams per person per day, equivalent to 3.7 hectolitres of wheat per year[30], this means that the produce of a cultivated hectare might have covered the payment obligations and assured the subsistence of more than one person. It should be borne in mind that many of these farm families were forced to offer their labour on the market due to their limited supply of land. They were, therefore, small landowners and labourers. As such, deflation gave them greater purchasing power than the wages earned by renting their arms or their teams. The contrast with commercial farms cannot be clearer. While the latter witnessed reduced gains, family farms were more stable and proved to be more resilient.

The above may be somewhat approximate, but it can help to identify the different effects of deflation on the viability of these exploitations. We

30. Bairoch, P., 1997, I, p. 152.

should add to these calculations some other liabilities which are particularly important, such as prior mortgage debts acquired by farmers, or the tax levies imposed by the monarchy through the feudal Parliament of Navarre in 2 August 1818 and 25 March 1829 (12.67 and 7.50 million *reales*, respectively), or by the constitutional government between 1820 and 1823 (11.53 million *reales*)[31]. That would only worsen the loss of margin for cereal producers, making it essential to have alternatives in order to adapt to such adverse circumstances. Theoretically, there were three ways to compensate for those trends and endure the deflation. These different, though not incompatible directions were: organisational change, technical change, and institutional change.

The first and the simplest was organisational change that adapted management strategy to the new circumstances. The farmer could replace the cheapest products with others, such as turning land used to cultivate cereals into vineyards, or changing agricultural land to pastures for livestock. As we have seen, the evolution of relative prices for grains, wine and olive oil reflected these changes immediately after 1815; but in the short term farmers may have been trapped between fixed investments in plantations and the risk of overproduction. The second organisational solution (particularly for large properties) was to shift the burden of the adjustment cost to the small family farm, whose resiliency we just demonstrated. An example was the land sales in *censo reservativo*, a method of financing sales where the purchaser retained the whole or a fraction of the purchase price, paying in exchange a fixed annual money rent[32]. Another method was the transfer by lease of estates formerly managed by owners to wage labour. That is exactly what the Marquis of San Adrián did in 1818 with the vineyards he managed in Cascante, which had been yielding annually an average of 1,500 litres of wine[33]. In 1824, Manuela Sesma Miñano, Tomás Arteta's widow, abandoned cereal farming and leased out the four hectares

31. Del Río, R., 1991.

32. The Tudela Hospital was one of the most active « ground renters » in those years. In June 1815, it sold 14 vineyard estates covering 7.93 hectares at a price of 38,347 *rvn*, which remained in the purchaser's hands at 5% interest. In May 1820, it sold another 16 estates covering 10.77 hectares at a price of 49,767 *reales*, and the eleven purchasers left agreed to a payment of 5 per cent interest on the capital (AGN, Contaduría de Hipotecas, Tudela, libro 246).

33. Direct farming in this location was not resumed until 1877 (Archivo de los Marqueses de San Adrián (AMSA) Monteagudo, Cuentas generales, cajas 15, 18, 33, 34, 41, 49, and 53).

she had sown up to that time[34]. In 1832, she ordered the stumps removed from 2.29 hectares of vines, which were then transferred to lease, and in 1835 she ordered removal of all the olive trees from the bigger farm (the Dehesilla y Ontinar, covering 10.24 hectares) and committed the land to large investments (4,805 *rvn* to level the terrain, build irrigation ditches, and plant more than a thousand fruit trees, besides spending 32,533 *rvn* in building houses and stockyards) to accommodate five families of settlers, who paid a combined rent in wheat and money[35]. In other cases, such as the Count of Bornos' olive groves, that possibility was considered but finally rejected[36].

Table 3. *Price evolution of rent and land sales in Mejana de Tudela, 1816-1845*

	Land Rent Value		*Land Sale Value*		*Rent value / Sale value*	*Money interest rate*	*Agricultural Prices*
Years	*Rvn/ha*	*Index*	*Rvn/ha*	*Index*	*%*	*%*	*Index*
1813-1814	-	-	28,229	75	-	-	141
1816-1820	1,753	100	37,745	100	4.6	4.7	100
1821-1825	1,794	102	30,163	80	5.9	4.9	74
1826-1830	1,561	89	30,010	80	5.2	4.7	57
1831-1835	1,180	67	21,506	57	5.5	5.0	61
1836-1840	1,595	91	26,078	69	6.1	5.3	79
1841-1845	1,744	99	37,362	99	4.7	5.5	66

Sources. AGN, Contaduría de Hipotecas, libros 246-250; AGN, Protocolos Notariales, Tudela, J. Yanguas y Miranda, J., 1813, p. 20-95; 1814, p. 27-85; 1820, caja 2-3.

Leasing was also beginning to emerge as a profitable business despite the agrarian crisis, because of the flexibility of small family holdings with a low opportunity- cost labour force. This observation is clearly supported

34. According to the account books started in 1822, the year's crops were 112.4 hectolitres of cereal, and 18 hectolitres were sown in 1823. Direct management affected 9.43 ha. of vines and 7.29 ha. of olive orchards (AGN, Sección archivos particulares, Arteta, caja 13, no. 53).

35. Management of this farm was recorded in a separate notebook (AGN, Sección archivos particulares, Arteta, caja 15, no.2). The transformation of cash rents into payments in kind, which we also found in this period, may have been used to protect the landowner from small tenants lack of liquidity.

36. The Cintruénigo estate accounts of 1830 show the payment for an expert report on the potential yield of olive orchards under lease in 1822-1826 (AHN, Sección Nobleza del AHN, Bornos, c. 172, d. 1).

by the movement of land sale prices and rent in Mejana de Tudela; though not large (57 hectares) it was a naturally very fertile area by the Ebro River and was used for intensive horticultural farming. The municipality owned the area until 1813, when it was privatised and divided into 152 small lots between October and May 1814 to cover the enormous expense of supplies and exactions demanded by opposing armies. The price of the land was initially evaluated at 23,100 *reales* per hectare, subsequently raised in public auctions up to 28,230 *rvn*/ha. In 1820, the City Hall put out four more lots to tender, valued at 29,600 *reales* per hectare at an auction price of 37,916 *reales*[37]. While agricultural prices sank (Table 3), land prices, on the contrary, increased, possibly as a result of capitalists seeking sheltered investments for the extraordinary profits they had made during the years of war and inflation. Title deeds for sales between individuals recorded in the *Accounts of Mortgage* books reflect a subsequent depreciation of around 20 per cent in the following decade; the lowest point was reached in the mid-1830s. What is interesting to note, however, is that the ratio between rent and sale prices evolved to 6 per cent, significantly above the average type of interest in effect for loans of capital in the region.

The change in landowner strategies can be seen in Figure 5, which shows the evolution of wage expenses from several estates[38]. The decrease in wage expenses can be perceived in all of them, partly due to the abandonment of direct management, and partly to the decrease in the intensity of labour compared to farming. This often implied overlooking some non-essential farming tasks such as giving a vineyard a second hoeing. In some other cases, however, new tasks were introduced which allowed for improved performance of the labour force in operations of higher volume and cost. Thus, from October 1827, there are notes in the accounts of the Count of Bornos' olive orchard, about the cost of using a labourer and horses to level the terrain « *para poder coxer con más facilidad y a menos coste la oliva* » (« in order to harvest the olives more easily and at less cost »)[39]. In digging vineyards as well, some changes were introduced as in the case of the Marquis of San Adrián's in Monteagudo, where he was able to reduce

37. AGN, Protocolos Notariales, Tudela, José Yanguas y Miranda (1813: 20-95; 1814: 27-85; 1820: caja 2-3).

38. Sources used for these series were:
AMSA (Monteagudo), Cuentas generales (cajas 53, 34, 41, 62, 38, 62, 49, 18, 33, 24, 38, 25, 43, 24, 33, 24, 17); AGN (Pamplona), sección archivos particulares, Arteta, caja 13 (53), 14 (21) and 15 (2, 27); *ibidem*, Baronía de la Torre, cajas 1, 12, 19, 24 and 26; AHN, Sección Nobleza del AHN, Bornos, c.172, d.

39. AHN, Sección Nobleza del AHN, Bornos, caja 172, d.1.

the number of workers required per hectare from 34 to 25 in the period between 1800 and 1845[40].

These examples reveal some landowners' interest in using labour-saving procedures. And this is precisely what our second option points to. In the long run, the most secure and significant alternative would have been to increase productivity through the lever of technical change. The goal could have been to raise the value of the produce obtained per unit of land, either increasing or regulating the amount of agricultural product obtained or introducing plants with a higher added value. But it could also have been to reduce the number of employees per unit of produce, the best example being the replacement of labour by capital through mechanization. In any case, the situation of the various agrarian production units differed. As already seen, the reduction in the number of labourers employed may have been caused by the needs of large holdings using wage earners, but this was not the case in family farming. In the smaller farms, the owners may have preferred to raise the value of the produce, even though it meant a greater amount of work. In any case, Spanish historiography has given little credit to the possibility of a significant technical change in nineteenth-century Iberian agriculture, given that until the late nineteenth century mechanization was almost nonexistent[41].

The truth is that it was not a simple and affordable option, mainly because it carried a risk. Moreover, technical change cannot be improvised: it requires a great deal of prior knowledge and expertise and an efficient flow of information. By the late eighteenth century there was a set of alternatives, to a great extent adapted from the new agriculture in Northern Europe, but also arising from a re-interpretation of classic recipes such as those of Columela or Herrera[42]: investment in irrigation infrastructure, spreading new crops for human and animal consumption (potato, corn, turnips, beetroot, alfalfa), new rotations, tree cultivation, and improved tillage with metal implements. The account books confirm that some of these initiatives were taken, especially those referring to arboriculture (olives and vineyards in almost all cases or fruit plantations in Manuela Sesma's farm) and irrigation. For example, between 1828 and 1830, the Marquis of San Adrián invested 12,500 *reales* to build a clay dam to irrigate his olive orchard; some years later Manuela Sesma's accounts record an outlay of 300 *reales* in 1843 for

40. Lana-Berasain, J. M., 1995, p. 153.

41. Simpson, J., 1995; Garrabou, R., 1990; Martínez-Ruiz, J.-I., 2000, p. 52-71.

42. Argemí, L., 1985.

a subscription to a plan for constructing a large clay-built pond[43]. Although there are no testimonies, family farming may have only performed some apparently minor innovations, but these could be very important for saving land, such growing potatoes, which freed up more wheat for the market, or the conditioning seeds against parasites before sowing, a practice promoted by clergymen, which may have reduced fluctuations in yields[44]. They could save short-term capital expenses too, making the seeding framework less extensive, as some contemporaneous treatises on agronomy suggested[45]. All in all, it has been correctly pointed out that technological change cannot be addressed separately from the institutional framework in which it occurs, and its limited progress in the eighteenth century was to a great extent the fault of obsolete political and social structures.

The last option, equally risky, was institutional change. To achieve this, individual decision-making was not enough; there was a need to establish co-operation and initiate some collective mobilisation of resources and this entailed a political stand. This also reflects path dependence: the conflicts that occurred during this depression cannot be understood without considering the clashes and tensions experienced in the previous stage of acute inflation. For small farms, the key lay in improving the ratio of land to human beings, which could allow more efficient use of family labour. This would overcome the resistance of the feudal lords, jealous of their political control over the community. It also required overcoming the opposition of sheep breeders, organised in guilds (*mestas*), and rentier landowners, all represented in local councils and interested in limiting the supply of farmland. The pressure to break up and distribute common grazing land was intense between 1760 and 1808, but after this date the expansion of cultivation had assumed major proportions because of the political weakness of those who had previously opposed it. The legal basis of this reclamation was the decree of the Cortes of Cadiz in 4 January 1813, restored in 1820, which ordered the sale of half the public lands and the allocation of land to

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43. La Hoya de Mostar, of 540 cubic meters, was the largest clay pond that Spain had, according to A. Llauradó, 1878, p. 158. Some other references point to 1820 irrigation-ditch enlargement plans and projects in Fitero (Labatores), in 1822 in Tudela (Mosquera), in 1825 in Cadreita, Arguedas and Valtierra (Yanguas y Miranda, J., 1828).

44. Remedies for cereal diseases through seed treatment, inspired by the experiences of French agronomist Tillet, had already been presented to Kingdom authorities in 1766 (AGN, Reino, Agricultura y Artes, legajo 2, carpeta 8), but they became more numerous between 1812 and 1818 (*ibidem*, legajo 2, carpeta 47; legajo 3, carpeta 7; legajo 3, carpeta 23).

45. Casas, N., 1845, p. 75; Blanco, A., 1857, p. 197-198; Holliday, R., 1960.

peasants. However, much of the expansion of cultivation in these years was done spontaneously and on the margins of legality[46].

The second area of institutional change focused on taxation in two ways. First, since 1808 the peasantry stopped paying in full and on time tithes and seigneurial taxes. Some years the payment was totally or partially suspended, and year after year the arrears were accumulated. These taxes collected by the church and the feudal lords were finally abolished in the 1840's, but many lords claimed in court the payment of these arrears. Second, because of increasing fiscal pressure from the army and the government, municipalities began to require the clergy and nobility, hitherto exempt, to pay taxes. The establishment of a new tax system in 1845 to confirm these changes was in part driven from below[47].

In the case of large landowners, many of them farmers using hired labour, there were two other factors. The first relates to the unity of the national market, particularly important in the case of Navarre, which had maintained its customs duties on the frontier with Castile and Aragon and kept its own foreign trade policy. For large farms in the valley of the Ebro, which traded wheat, wine, and oil at prices that were steadily declining, integration into the Spanish market by shifting the customs barrier to the Pyrenees had become a crucial issue. After arduous political debates in the parliament of Navarre in 1818 and 1828, and a temporary abolition of duties from 1820 to 1823, the transfer of customs to the border with France took place legally in 1841[48].

The second factor relates to the full and free disposition of a landowner's property, a case involving, on the one hand, the rights of use by third parties (*servidumbres*) and, on the other, the impediments to selling, exchanging, and dividing farms (*mayorazgos*). The decree of the Cortes

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46. Llopis, E., 2002, p. 178-180. In Monteagudo in 1812 and 1820, the Marquis de San-Adrian demanded compensation for several plots that the villagers had broken up and distributed without the lord's permission. In 1822 an agreement was reached whereby the farmers would enjoy this land for 25 years without paying any rent, and that after 1848 they would pay a fixed fee of 1.57 hectolitres of wheat per hectare. In 1825, the administrator warned that many peasants had added small strips of land to the parcels they had been assigned, and he advised leaving it that way (AMSA, box 20, 1). See also J.-M. Usunariz, 2004.

47. Canales, E., 1982; Comín, F., 1991, p. 72-74. The Marquis of San Adrián did not collect taxes (*pechas*) in San Adrian manor in 1814 and 1815, between 1820 and 1826, and finally after 1833. The municipality argued that he could refuse to pay because the taxes were feudal origin. At the same time, the village seized wheat from his barn in 1820, and again in 1828, to cover contributions to the payment he had resisted (AMSA, box 1, 5; box 22, 8).

48. Del Río, R., 1985; 1987, p. 123-133.

of Cadiz on 8 June 1813 (*acotamientos*) addressed the first issue, while the second was the object of the law of disendowment (*desvinculación*) of 27 September 1820 (both restored in 1836). The repeal of these laws in 1823 did not prevent property belonging to *mayorazgos* going on sale on the market, as seen in Table 4[49].

Table 4. *The land market as recorded in Mortgage Books of Tudela, according to sale modality (data expressed in hectares)*

	Free sales		*Censo reservativo*		*Desvinculación*		*Desamortización*		*Total*	*Mobility Rate*
	Ha.	*%*	*Ha*	*%*	*Ha.*	*%*	*Ha.*	*%*	*Ha.*	*%*
1816-1820	14.12	43	10.77	33	7.84	24	0.00	0	32.73	0.23
1821-1825	66.03	66	4.09	4	29.85	30	0.00	0	99.97	0.71
1826-1830	54.95	56	1.42	1	41.31	42	0.00	0	97.68	0.69
1831-1835	68.37	86	10.76	13	0.61	1	0.00	0	79.74	0.56
1836-1840	46.57	46	4.94	5	11.39	11	37.83	38	100.73	0.71
1841-1845	93.34	36	30.37	12	66.07	26	67.88	26	257.66	1.82

Notes. *Censo reservativo* is a financed sales modality where the purchaser retained the whole or a fraction of the purchase price, paying in exchange a fixed annual rent in money. *Desvinculación* refers to the sale of noble properties subject to primogeniture. *Desamortización* consists in the nationalization and sale by the state of the properties of the Catholic Church. The mobility rate is calculated on 2,834 arable lands in Tudela.

Source. AGN, Contaduría de Hipotecas, books 243-253 and 231. The mobility rate is calculated on 2,834 arable lands in Tudela.

The ability to sell properties subject to primogeniture allowed not only repayment of debts but also streamlining and adding to inheritance through acquisition of other properties. On several occasions when the state decreed the nationalization and sale of church estates (1798, 1810, 1820, 1836) these lands became the best way to create viable economic units, because they were located in more fertile soil. At this time however, church property was sold not only on state initiative, but often because ecclesiastical bodies

49. José Joaquín Fernández de Villavicencio, Count of Villarrea, and Jose Maria Magallon, Marquis of San Adrian, sold some properties (23.55 hectares the first one, and 15.95 hectares the second) to the Theological Seminary of Tudela. They were forced to reinvest the acquired amount (144,632 *reales* in the first case and 181,102 *reales* in the second) in entailed estate improvements (AGN, Contaduría de Hipotecas, vol. 248).

themselves had to sell and had been given the legal right to do so because of the financial difficulties caused by war[50].

All this resulted in significant mobility in the land market, increasing the rate of mobility in the area of Tudela from less than 0.25 per cent in the period 1816-1820 to 0.70 per cent in the 1820s, and up to 1.82 per cent in the 1840s. The social groups that participated more actively in those markets as land purchasers were landowners and traders, well-situated to reinvest their earnings and attracted by the profitability of leasing land, and peasants (who acquired 32 per cent of the land sold and accounted for 23 per cent of its value), who found land a means of stabilizing their position[51].

Institutional change in Spain took several decades to complete. It was not until the period 1834-1843 that the changes announced by the Cortes of Cádiz between 1810 and 1813 finally came about. The restoration of absolutism in 1814 and again in 1823 ended the first attempts to establish a new institutional order. The three main legislative measures, that is to say abolition of the seigneurial regime, liberalisation of primogeniture inheritance (*desvinculación*), and confiscation of church property (*desamortización*), were only implemented after 1836. That is when mobility in land on the market was more intense. It was also at that time that it was determined which social groups would define property rights[52]. But institutional change was not only a top-down movement, and was not limited to these three laws. From 1815 to 1830, a host of local clashes called into question the institutional framework of the *Ancien Régime*. With liberalisation of the market and the establishment of a national market, which moved Navarrean customs from the Ebro to the Pyrenees, the foundations were laid for a new model allowing a fresh cycle of growth from the 1840s onwards.

*

The aim of this paper was to identify the common traits and local peculiarities of the widespread economic crisis that was unleashed after the end of Napoleonic Wars. We reviewed the proposed explanations for the crisis

50. In 1815 and again in 1823, some monasteries, once powerful, tried being active again after years of war. Given their financial hardship they had no choice but to sell part of its assets to obtain cash. La Oliva Monastery, between 1814 and 1815, sold rural and urban estates valued at 420,465 *reales* (AGN, Clero, La Oliva, vol. 533) and at the same time, the monastery of Fitero sold farms valued in 100,523 *reales* (AGN, Clero, Fitero, vol. 458).

51. Lana-Berasain, J.-M & De la Torre, J., 2011.

52. García-Sanz, A., 1985; Congost, R., 2006; Robledo, R., 1993, p. 48-53.

and support an eclectic interpretation which assigns the main role to factors related to the supply of agricultural products, although it does not exclude the supplementary effect of other forces related to demand, relative cost of transportation, or to the monetary supply. The latter probably explains the long duration of deflation in Spain; while in other countries there is evidence of a price recovery starting in 1826 Spain had to wait for a civil war, which occurred eight years later.

In the second part of this paper the effect of price deflation on the agricultural sector has been assessed. To accomplish this, the movement of some key items was contrasted against the general evolution of production costs: a farm labourer's day's pay, rent price for a yoke of mules, land rent in kind, and the interest rate for money. There is proof that farm profits fell because the price of produce declined while production costs remained more inflexible. Through a simulation exercise, we provided evidence that the effects were more harmful for large and medium sized holdings using wage labour, than for small farms, which were able to use only family labour. From this evidence, we reviewed the three main options available to farmers: (1) modification of management strategy, partial or full abandonment of direct farming, and transfer of the adjustment cost to family farming; (2) adoption of innovations intended to increase productivity (either in physical terms or increasing the land's value, saving the land or working it more intensively); and finally (3) the transformation of the institutional framework through reformation measures included in the liberal revolution manifesto, *i.e.* liberalisation of the land (*desamortización*, *desvinculación*) and the emergence of a national market. In the case of Navarre the first option was widely adopted, even though it did not mean the complete abandonment of commercial agriculture at the expense of subsistence farming. The second option was less popular, but it is almost certain that a significant increase in productivity occurred[53]. Nevertheless, it was the third option which in the end was more important. It was part of a broader process of political change, but it only finally consolidated at the end of the period considered here.

53. Lana-Berasain, J. M., 2011.

Abbreviations

Rvn.	reales de vellón
Hl.	hectoliter
Ha.	hectare
Qm	metric quintal
AHN	Archivo Histórico Nacional
AGN	Archivo General de Navarra
AMSA	Archivo de los Marqueses de San Adrián

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